A3 Cells and growth

Learn about:
- Growth
- Cell division

How living things grow

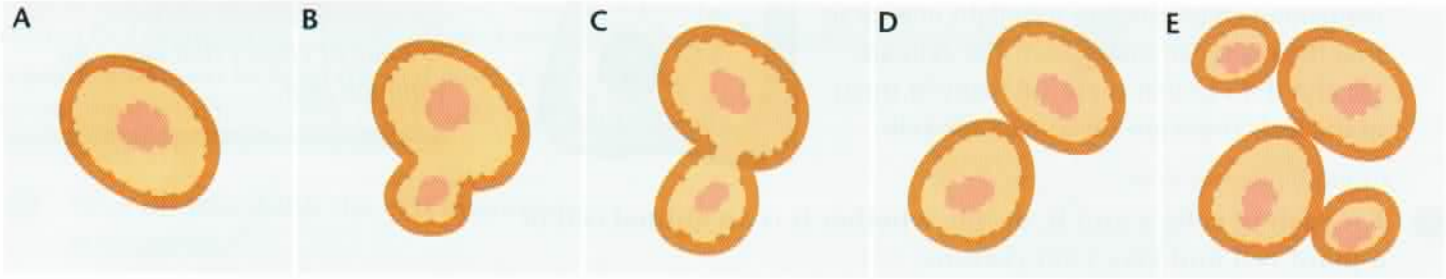
Living things start small and get bigger. This is called **growth**. You started off life as a single cell the size of the full stop at the end of this sentence. You have grown a lot since then!

This growth is achieved by:

- increasing the number of cells
- increasing the size of cells between divisions.

Increasing the number of cells

If we use a microscope we can observe living cells dividing. This is called **cell division**. Cell division is very easy to observe in organisms with only one cell. Pictures A to E show one yeast cell making two and then four cells. Photo X shows another unicellular organism immediately after cell division.



a **How many cells would there be if all the yeast cells in E divided again?**

b **Use the scale bar on photo X to estimate the length and the width of one cell.**

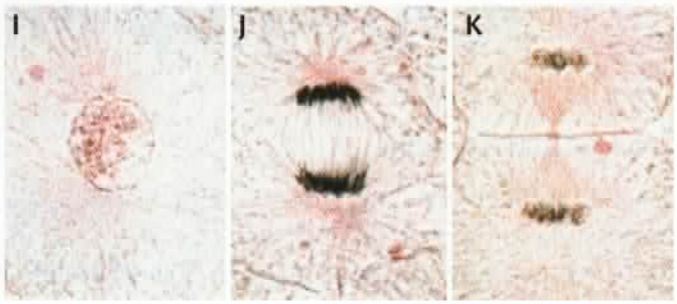
It is much more difficult to see cell division in plants and animals, because the cells are grouped together in tissues. Photos F to H show a plant cell dividing. Photos I to K on page 7 show an animal cell dividing. The cells have all been stained with dyes to make the parts of the cell show up better.

c **It is hard to see the cell membrane in photos F to H. What part of the cell can be seen around the outside of each cell?**

Did you know?

Humans start life as a single cell. An adult human contains about 50 000 000 000 000 cells. A single cell would have to divide 46 times to make enough cells for an adult human.

Look at photos I to K. When a cell divides, the nucleus divides first. This is because the nucleus controls the cell. It contains all the information to make sure the cell runs properly. It is very important that every cell has a complete nucleus, with a full set of instructions. During cell division the cell makes two nuclei, and then the cytoplasm and the membrane divide so that one nucleus is in each new cell.



Cells increase in size

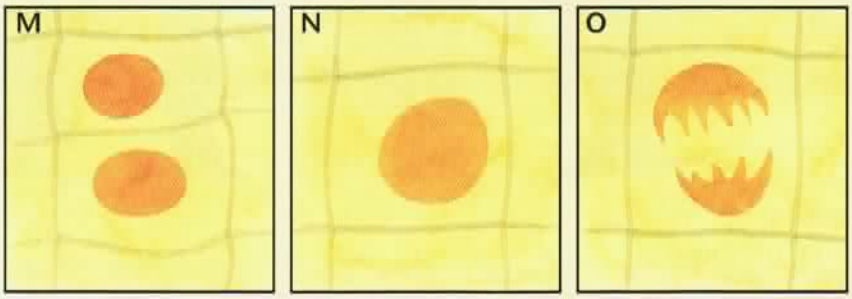
When a cell divides, it makes two smaller cells. If you compare photos F and H you can see that the two new cells (H) are smaller than the original cell (F). It is the same if you compare I and K. However, the cells do not stay smaller. They increase in size until they are big enough to divide again.

This is shown clearly with the yeast cells. Yeast cells do not divide into two equal parts. Instead the new cell starts off smaller. Look at photos B to D. The new cell starts as a little bud and then increases in size.

d **What would happen if a cell kept dividing but did not increase in size between divisions?**

Questions

1 a Look pictures M to O. Write the letters in the correct order to show cell division.



b Do M, N and O show plant cells or animal cells? Explain your answer.

c Which part of the cell divides first?

d Why does this part of the cell divide first?

e The cells look purple because they have been stained with a dye. Why was this done?

f Multicellular organisms grow using cell division, as shown in pictures M to O. What else happens to cells when organisms grow?

2 a This series of numbers shows cell division.

1 2 4 8 16 ...

What are the three next numbers in the series?

b A bacterium divides once every 20 minutes. Starting with one bacterium, how many bacteria will there be after two hours?

Did you know?

Many scientific words are Greek or Latin. This means they use Greek and Latin ways of showing plurals.

Singular	Plural
nucleus	nuclei
cactus	cacti
fungus	fungi
bacterium	bacteria
alga	algae

For your notes:

- All cells are made from other cells.
- Cells divide into two to make more cells. This is called **cell division**. The nucleus divides first.
- Cells increase in size after they divide.
- **Growth** is a combination of increasing the number of cells and increasing the size of the cells.